Quick setup guide

Radar sensor for continuous level measurement of bulk solids

VEGAPULS 67

HART and accumulator pack

Document ID: 47154

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Information:
This quick setup guide enables a quick setup of your instrument.

You can find further information in the corresponding, comprehensive operating instructions. This manual is available on the supplied DVD or in the download area under "*www.vega.com*".

Operating instructions VEGAPULS 67 - HART and power pack: Document-ID 40795
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1 For your safety

1.1 Authorised personnel

All operations described in this operating instructions manual must be carried out only by trained specialist personnel authorised by the plant operator.

During work on and with the device the required personal protective equipment must always be worn.

1.2 Appropriate use

The VEGAPULS 67 is a sensor for continuous level measurement. Due to the integrated accumulator the instrument is particularly suitable as a portable measuring system or test sensor for special applications.

You can find detailed information about the area of application in chapter "*Product description*".

Operational reliability is ensured only if the instrument is properly used according to the specifications in the operating instructions manual as well as possible supplementary instructions.

1.3 Warning about incorrect use

Inappropriate or incorrect use of the instrument can give rise to application-specific hazards, e.g. vessel overfill or damage to system components through incorrect mounting or adjustment.

1.4 General safety instructions

This is a state-of-the-art instrument complying with all prevailing regulations and guidelines. The instrument must only be operated in a technically flawless and reliable condition. The operator is responsible for the trouble-free operation of the instrument.

During the entire duration of use, the user is obliged to determine the compliance of the necessary occupational safety measures with the current valid rules and regulations and also take note of new regulations.

The safety instructions in this operating instructions manual, the national installation standards as well as the valid safety regulations and accident prevention rules must be observed by the user.

For safety and warranty reasons, any invasive work on the device beyond that described in the operating instructions manual may be carried out only by personnel authorised by the manufacturer. Arbitrary conversions or modifications are explicitly forbidden.

The safety approval markings and safety tips on the device must also be observed.

Depending on the instrument version, the emitting frequencies are in the C or K band range. The low emitting frequencies are far below the internationally approved limit values. When used correctly, there is no danger to health.

1.5 CE conformity

The device fulfills the legal requirements of the applicable EC guidelines. By affixing the CE marking, we confirm successful testing of the product.

You can find the CE Certificate of Conformity in the download section of our homepage.

1.6 NAMUR recommendations

NAMUR is the automation technology user association in the process industry in Germany. The published NAMUR recommendations are accepted as the standard in field instrumentation.

The device fulfills the requirements of the following NAMUR recommendations:

- NE 21 – Electromagnetic compatibility of equipment
- NE 43 – Signal level for malfunction information from measuring transducers
- NE 53 – Compatibility of field devices and display/adjustment components
- NE 107 – Self-monitoring and diagnosis of field devices

For further information see www.namur.de.

1.7 Radio license for Europe

The instrument is approved according to EN 302372-1/2 (2006-04) for use in closed vessels.

1.8 Radio license for USA/Canada

The instrument is in conformity with part 15 of the FCC regulations. Take note of the following two regulations:

- The instrument must not cause any interfering emissions
- The device must be insensitive to interfering immissions, including those that may cause undesirable operating conditions

Modifications not expressly approved by the manufacturer will lead to expiry of the operating licence according to FCC/IC.

The instrument is in conformity with RSS-210 of the IC regulations.

The instrument may only be used in closed vessels made of metal, concrete, or fibre-reinforced plastic.

1.9 Environmental instructions

Protection of the environment is one of our most important duties. That is why we have introduced an environment management system with the goal of continuously improving company environmental protection. The environment management system is certified according to DIN EN ISO 14001.

Please help us fulfill this obligation by observing the environmental instructions in this manual:

- Chapter "*Packaging, transport and storage*"

- Chapter "*Disposal*"

2 Product description

2.1 Configuration

Type label

The type label contains the most important data for identification and use of the instrument:

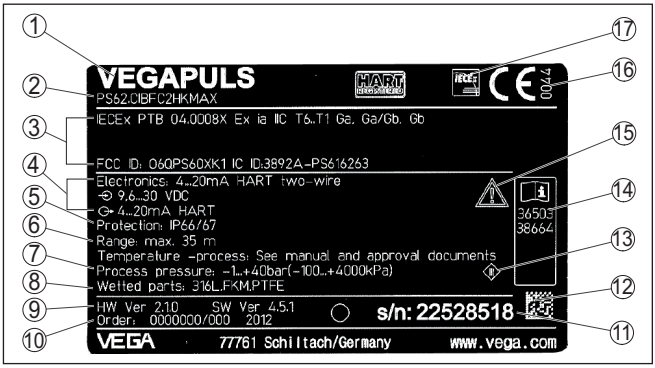

Fig. 1: Layout of the type label (example)

1 *Instrument type*
2 *Product code*
3 *Approvals*
4 *Power supply and signal output, electronics*
5 *Protection rating*
6 *Measuring range*
7 *Process and ambient temperature, process pressure*
8 *Material, wetted parts*
9 *Hardware and software version*
10 *Order number*
11 *Serial number of the instrument*
12 *Data-Matrix-Code for Smartphone-App*
13 *Symbol of the device protection class*
14 *ID numbers, instrument documentation*
15 *Reminder to observe the instrument documentation*
16 *Notified authority for CE marking*
17 *Approval directive*

Serial number - Instrument search

The type label contains the serial number of the instrument. With it you can find the following instrument data on our homepage:

- Product code (HTML)
- Delivery date (HTML)
- Order-specific instrument features (HTML)
- Operating instructions and quick setup guide at the time of shipment (PDF)
- Order-specific sensor data for an electronics exchange (XML)
- Test certificate (PDF) - optional

Go to www.vega.com, "*VEGA Tools*" and "*Instrument search*". Enter the serial number.

Alternatively, you can access the data via your smartphone:

- Download the smartphone app "*VEGA Tools*" from the "*Apple App Store*" or the "*Google Play Store*"
- Scan the Data Matrix code on the type label of the instrument or
- Enter the serial number manually in the app

3 Mounting

3.1 Collar or adapter flange

For mounting the instrument on a socket, a combi compression flange for DN 80 (ASME 3" or JIS 80) is also available for retro fitting. Optionally, the instrument can be also equipped with an adapter flange from DN 100 (ASME 4" or JIS 100).

With the housing versions plastic, aluminium single chamber and stainless steel, the collar flange can be placed directly over the housing. With the aluminium double chamber housing, retroactive mounting in this way is not possible - the mounting type must be specified with the order.

You can find drawings of these mounting options in chapter "*Dimensions*".

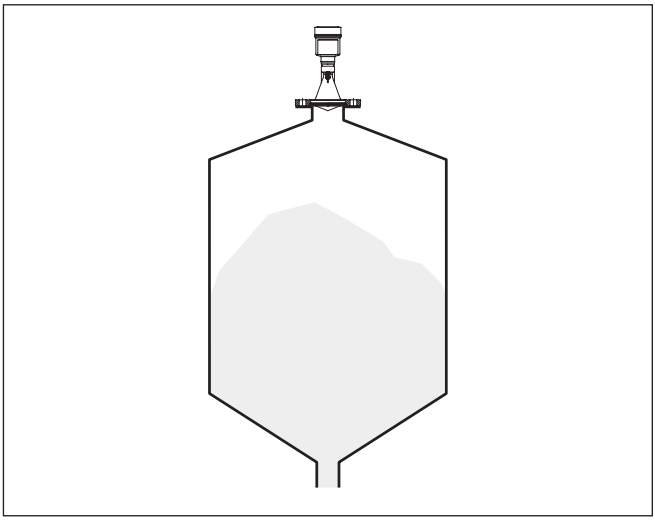

Fig. 2: Flange mounting of the radar sensor

3.2 Mounting strap

Mounting strap

The mounting strap enables simple mounting on the vessel wall or silo top. It is suitable for wall, ceiling or boom mounting. Especially in open vessels this is a very easy and effective way to align the sensor to the bulk solid surface.

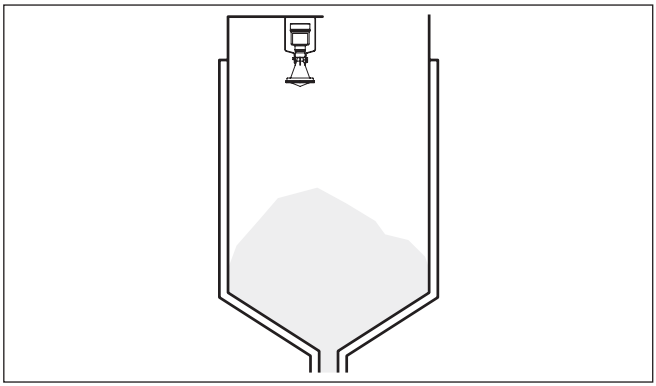

Fig. 3: Radar sensor with mounting strap

The strap is supplied unassembled and must be screwed to the sensor before setup with three hexagon screws M5 x 10 and spring washers. Max. torque, see chapter "*Technical data*". Required tools: Allen wrench size 4.

There are two ways to screw the strap onto the sensor. Depending on the selected version, the sensors can be swivelled in the strap as follows:

- Single chamber housing
  - Angle of inclination 180°, infinitely variable
  - Angle of inclination in three steps 0°, 90° and 180°
- Double chamber housing
  - Angle of inclination 90°, infinitely variable
  - Angle of inclination in two steps 0° and 90°

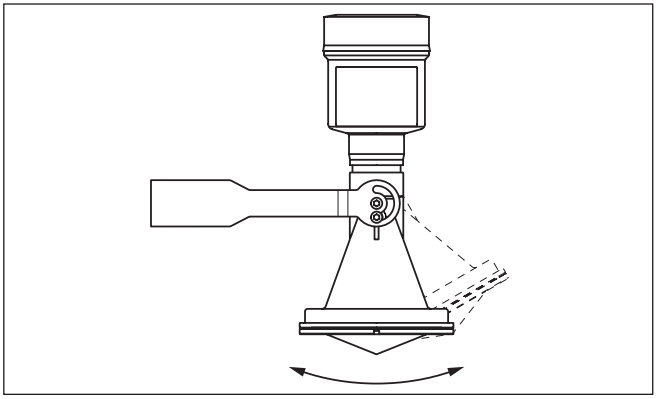

Fig. 4: Adjustment of the angle of inclination

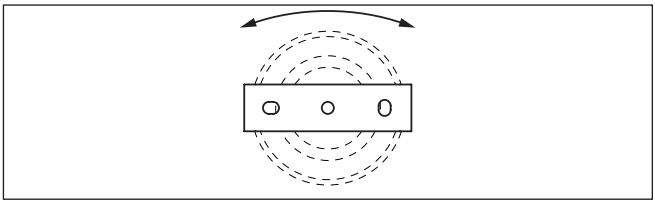

Fig. 5: Turning by fastening in the centre

3.3 Mounting instructions

Mounting

1. Distance from the vessel wall > 200 mm

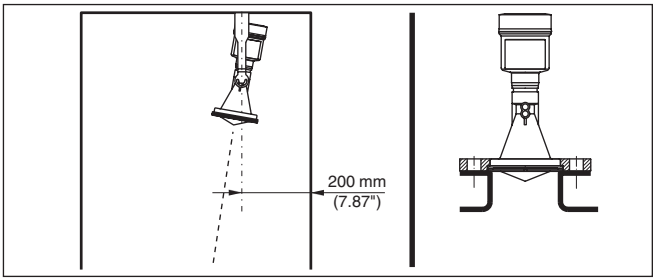

Fig. 6: Distance of the antenna to the vessel wall/socket configuration

2. Keep the socket short, round off the socket end

For further information see chapter "*Mounting*".

4 Connecting to power supply

4.1 Connection of the battery charger

We recommended charging the integrated accumulator completely before setting up the instrument. You can find the charging time in chapter "*Technical data*".

The battery charger is plugged into a socket in the supply room, see chapter "*Wiring plan*".

The LEDs in the supply room show the charging process and condition of the accumulator, see chapter "*Wiring plan*".

4.2 Wiring plan

Supply room

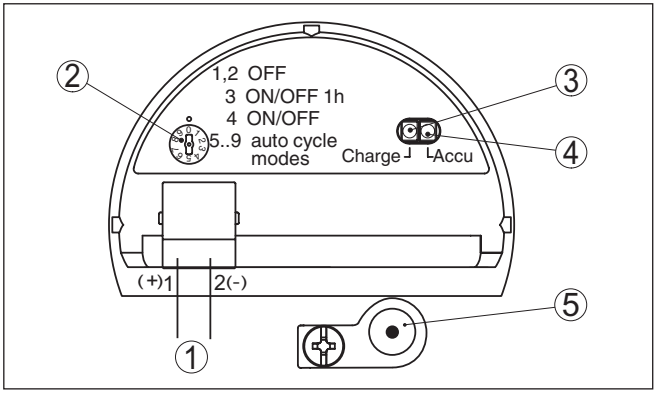

Fig. 7: Supply room

1 Internal connection of the socket for the battery charger
2 Mode switch
3 LED green, charging process
4 LED yellow, charging status
5 Socket for the battery charger

The mode switch enables the selection of the following modes:

- 0 = sensor off, LEDs show the accumulator status
- 1, 2 = sensor off, LEDs off
- 3 = sensor on for 1 hour after pressing a key (delivery status)
- 4 = sensor permanently on, switching on/off via button
- 5 = sensor is switched on every 30 min. for 3 min.
- 6 = sensor is switched on every hour for 3 min.
- 7 = sensor is switched on every 6 hours for 3 min.
- 8 = sensor is switched on every 12 hours for 3 min.
- 9 = sensor is switched on every 24 hours for 3 min.

The green LED characterizes the charging process:

- LED flashes = Accumulator is charging
- LED lights = accumulator is full, battery charger should be unplugged (accumulator life time)

After pressing the key or changing the mode the yellow LED shows the accumulator status for approximately 10 s as follows:

- LED lights = accumulator is full
- LED flashes = accumulator should be charged
- LED off = accumulator is empty

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5 Set up with the display and adjustment module

5.1 Insert display and adjustment module

The display and adjustment module can be inserted into the sensor and removed again at any time. You can choose any one of four different positions - each displaced by 90°. It is not necessary to interrupt the power supply.

Proceed as follows:

1. Unscrew the housing cover
2. Place the display and adjustment module in the requested position onto the electronics and turn to the right until it snaps in
3. Screw housing cover with inspection window tightly back on

Removal is carried out in reverse order.

The display and adjustment module is powered by the sensor, an additional connection is not necessary.

Fig. 8: Installing the display and adjustment module in the electronics compartment of the single chamber housing

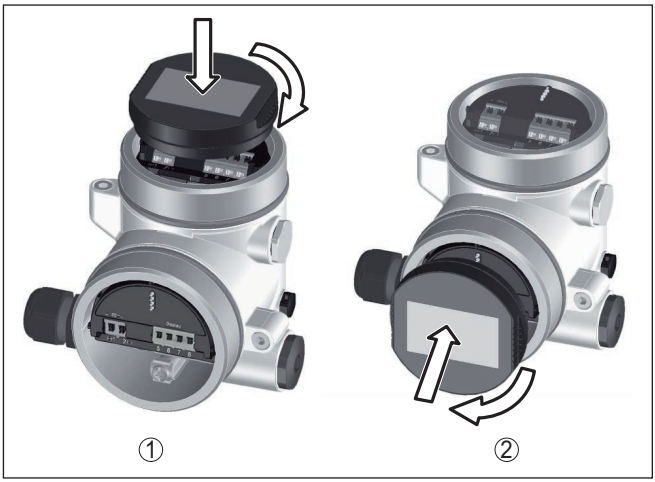


Fig. 9: Insertion of the display and adjustment module into the double chamber housing

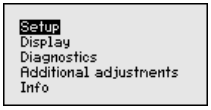
1 In the electronics compartment
2 In the connection compartment (with Ex-d-ia version not possible)

Note:
If you intend to retrofit the instrument with a display and adjustment module for continuous measured value indication, a higher cover with an inspection glass is required.

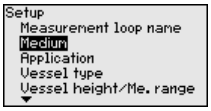
5.2 Parameter adjustment

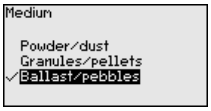
Set parameters

1. Go via the display and adjustment module to the menu "*Setup*".

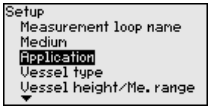


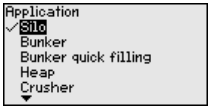
2. Select in the menu item "*Medium*" the medium of your application, for example "*Gravel/Pebble*".



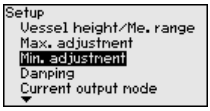


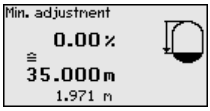
3. Select in the menu item "*Application*" the vessel, the application and the vessel form, for example, silo.

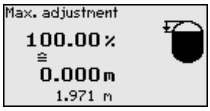




4. Carry out the adjustment in the menu items "*Min. adjustment*" and "*Max. adjustment*".







Parameterization example

The radar sensor measures the distance from the sensor to the product surface. For indication of the real level, an allocation of the measured distance to the percentage height must be carried out.

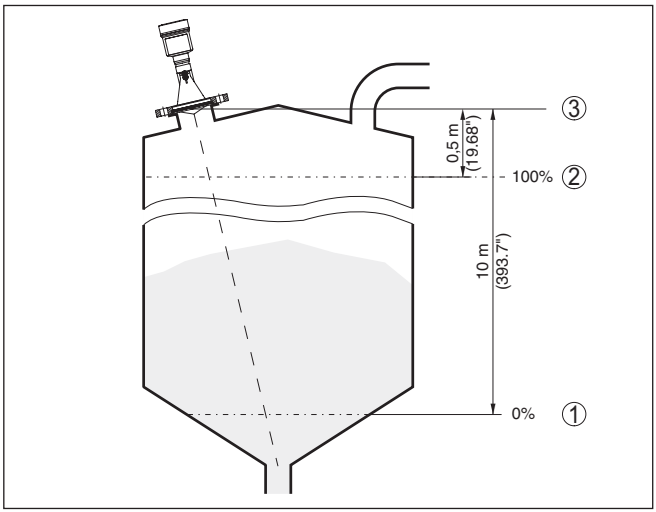


Fig. 10: Parameterization example

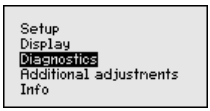
1 Min. level ≙ max. meas. distance
2 Max. level ≙ min. meas. distance

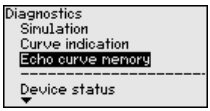
For this adjustment, the distance is entered when the vessel is full and nearly empty. If these values are not known, an adjustment with other distances, for example, 10 % and 90 % is also possible. Starting point for these distance specifications is always the seal surface of the thread or flange.

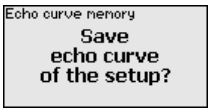
Diagnostics - Echo curve memory

With the function "*Echo curve memory*" the echo curve can be saved at the time of setup. This is generally recommended; for using the Asset Management functions it is absolutely necessary. If possible, the curve should be saved with a low level in the vessel.

With the adjustment software PACTware and the PC, the high resolution echo curve can be displayed and used to recognize signal changes over the operating time. In addition, the echo curve of the setup can be also displayed in the echo curve window and compared with the actual echo curve.







Additional adjustments - False signal suppression

The following circumstances cause interfering reflections and can influence the measurement:

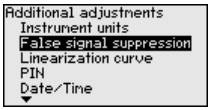
- High sockets
- Vessel installations such as struts
- Agitators
- Buildup or welded joints on vessel walls

Note:
A false signal suppression detects, marks and saves these false signals so that they are no longer taken into account for level measurement.

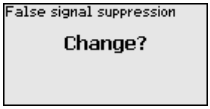
This should be done with the low level so that all potential interfering reflections can be detected.

Proceed as follows:

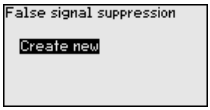
1. Select the menu item "*Additional settins*" with ***[->]*** and confirm with ***[OK]***. With ***[->]*** you have to select the menu item "*False signal suppression*" and confirm with ***[OK]***.



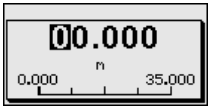
2. Confirm again with ***[OK]***.



3. Confirm again with ***[OK]***.



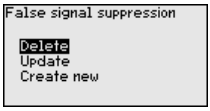
4. Confirm again with ***[OK]*** and enter the actual distance from the sensor to the product surface.



5. All interfering signals in this section are detected by the sensor and stored after confirming with ***[OK]***.

Note:
Check the distance to the product surface, because if an incorrect (too large) value is entered, the existing level will be saved as a false echo. The filling level would then no longer be detectable in this area.

If a false signal suppression has already been created in the sensor, the following menu window appears when selecting "*False signal suppression*":



The menu item "*Delete*" is used to completely delete an already created false signal suppression. This is useful if the saved false signal suppression no longer matches the metrological conditions in the vessel.

The menu item "*Extend*" is used to extend an already created false signal suppression. This is useful if a false signal suppression was carried out with a too high level and not all false signals could be detected. When selecting "*Extend*", the distance to the product surface of the created false signal suppression is displayed. This value can now be changed and the false signal suppression can be extended to this range.

6 Supplement

6.1 Technical data

External battery charger	
Mains voltage	100 … 240 V AC
Output voltage	24 V DC
Output current (shortcircuit proof) max.	500 mA
Load current limitation	70 mA
DC plug (inside plus, outside minus)	2.1 mm

Integrated accumulator	
Type	Lithium ions
Voltage	14.8 V
Accumulator capacity	4.7 Wh
Charging period from 0 % to 100 % approx.	4 h
Operating time after 10 min. charging of 0 %	> 3 h
Operating time in mode 4 (sensor permanently on) with completely charged accumulator	> 60 h
Temperature range	
– Charge accumulator	0 … +45° C (+32 … +167 °F)
– Accumulator operation	-20 … +60° C (-4 … +140 °F)
Temperature derating accumulator capacity	
– +25° C (+77 °F)	100 %
– -10° C (+14 °F)	50 %

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Printing date:

All statements concerning scope of delivery, application, practical use and operating conditions of the sensors and processing systems correspond to the information available at the time of printing.
Subject to change without prior notice

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